SCHEDULE-III (PART-A)

TECHNICAL SPECIFICATION FOR 12 KV OUTDOOR VACUUM CIRCUIT BREAKER KIOSKS AGAINST TN-2064

1.0 SCOPE

This specification is intended to cover the design manufacture, assembly, testing at manufacturer's works, supply, delivery of 12 kV Vacuum Circuit breaker Kiosks with current transformers, Potential transformers, protection relays, metering instruments etc. Complete with all materials and accessories and installation & commissioning by the supplier as per Schedule-III (Part-B) for efficient and trouble free operation (Separate price for Installation & Commissioning and Civil works).

1.1 It is not the intent to specify completely herein all details of the design and construction of equipments. However, the equipment shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation upto the Bidder's guarantee in a manner acceptable to the Purchaser, who will interpret the meanings of drawings and specifications and shall have the power to reject any work or material which in his judgment is not in accordance therewith. The offered equipment shall be complete with all components necessary for its effective and trouble free operation along with associated equipments, interlocks, protection schemes etc. Such components shall be deemed to be within the scope of supply, irrespective of whether those are specially brought out in this specification and/or the commercial order or not.

2.0 STANDARDS

The 12 KV vacuum circuit breaker Kiosks shall conform to latest revisions with amendments of standards as under unless specified otherwise. Equipment meeting any other authoritative standard which ensure equal or better quality than the standard mentioned above will also be acceptable. In such cases a copy of standard (English version) adopted, should be enclosed with the tender.

IEC56/IS:13118/IS-3427	Circuit Breaker/ metal enclosed Switchgear and control gear.
IS: 3156	Voltage transformers.
IS: 2705	Current transformers.
IS: 3231	Electrical Relays for power system.
IS:1248	Meters and Instruments
IS:14697-1999	Specification for AC static transformer operated watt hour and VAR hour meters class 0.2 S & 0.5 S.

IEC-62053-22-2003 IEC-62052-11-2003	Specification for AC Static Watt hour Meters, class 0.2 S & 0.5 S.
CBIP Technical Report No.88 revised July, 1996 read with amendment issued (April,99, September,99 and also any other amendment thereafter).	Specification for AC Static Electrical Energy Meter.

3.0 CLIMATIC CONDITIONS:

Equipment to be supplied against this specification shall be suitable for satisfactory continuous operation under the following tropical conditions :-

i) Peak ambient air temperature in shade.	**50 DEG C**
ii) Minimum ambient air temperature in shade	**(-) 5 DEG C**
iii) Maximum relative humidity.	**95 %**
iv) Minimun relative humidity	**10 %**
v) Dust storms are liable to occur from the period	**March to July**
vi) Height above mean sea level	**less than 1000M**
vii) Average number of thunder storms days per annum.	**40 DAYS**
viii) Average annual rainfall	**10-100 cm (Depending on area)**
ix) Number of months of tropical monsoon conditions p.a.	**4**

4.0 PRINCIPAL PARAMETERS OF CIRCUIT BREAKERS

4.1 TYPE AND RATING	**12 kV**
4.1.1 Type	**Vacuum circuit breaker**
4.1.2 Service	**Outdoor**
4.1.3 Pole	**3**
4.1.4 Rated voltage (nominal/max.)	**11/12 kV**
4.1.5 Rated frequency	**50 HZ**

4.1.6	**System Neutral earthing**	**Effectively grounded.**
4.1.7	**INSULTATION LEVEL**	
4.1.7.1	**Impulse withstand**	**75 kVp**
4.1.7.2	**One minute power frequency withstand voltage.**	**35 kV rms as per IS-3427**
4.1.8	**Rated Current**	
4.1.8.1	**Continuous at 50 ^{o}C.**	**630 A**
4.1.8.2	**Short time current for 3 Sec.**	**16 kA**
4.1.9	**Rated Breaking Capacity**	
4.1.9.1	**Symmeterical**	**16 kA**
4.1.9.2	**Asymmeterical**	**As per relevant standard**
4.1.10	**Rated making capacity**	**2.50X16 KA**
4.1.11	**Rated short time with-stand current 3 secs.**	**16 KA**
4.1.12	**Total break time**	**5 cycles(Max.)**
4.1.13	**Creepage distance**	**300 mm or more**
4.1.14	**Protection class of kiosk**	**IP-55 as per IEC 529**
4.1.15	**Operating duty For gang operation**	**O-3min-CO-3min-CO**
4.1.16	**Operating Mechanism**	**motor operated spring charged closing mechanism or Magnetic Actuator.**
4.1.17	**Spring charging Motor**	**220V-240V**
4.1.17.1	**Heater/Lamp/Socket.**	**240V AC**
4.1.18	**Terminal Connector**	
4.1.18.1	**Type**	**Bimetallic clamp type/ Al. alloy.**

4.1.18.2	**Suitable for ACSR conductor**	**10% Panther and 90% Dog Conductor**
4.2	**System details**	
4.2.1	**H.V. System Voltage (Nominal/Max.)**	**11/12 kV**
	Phases	**3**
	System Neutral	**Effectively earthed.**
	Fault level	**16 KA r.m.s. Symmetrical**
4.2.2	**Auxiliary power Supply**	
4.2.2.1	**A.C. Supply**	**1. 415 volts 3 ph 4 W 50 Hz 2. 240V 1 Ph 2 W 50 Hz**

5. GENERAL TECHNICAL REQUIREMENTS:-

5.1 DESIGN CRITERIA

The bidder shall quote 12 KV Outdoor VCB Kiosks conforming to M-2 class only. The equipment will be used in high voltage system having characteristics as listed in the specification. The equipment will be installed outdoor in a hot, humid and tropical atmosphere. All equipment, accessories and wiring shall have tropical protection, involving special treatment of metal and insulation against fungus, insects and corrosion.

The maximum temperature in any part of the equipment at specified rating shall not exceed the permissible limits as stipulated in the relevant standards.

The equipment shall be capable of withstanding the dynamic and thermal stresses of listed short circuit current without any damage or deterioration.

The safety clearances of all live parts of the equipment shall be as per relevant standards.

5.2 SPECIFIC REQUIREMENTS

5.2.1 The vacuum circuit breaker kiosk shall be for outdoor installation. The duty of the circuit breaker shall involve satisfactory interruption of short circuit currents as listed in the specification. The breaker shall be capable of interruption of low reactive current (lagging/leading) without undue over voltage.

5.2.2 CONSTRUCTIONAL FEATURE

5.2.2.1 The circuit breakers shall be triple pole horizontal draw out/ fixed type enclosed in Kiosk of CRCA sheet steel of 3 mm thickness for load bearing members and 2 mm thickness for non-load bearing members and shall comply with latest edition of IS:13118/3427/IEC-56. The Kiosk shall be vermin proof and dust tight. The switchgears and Control gears shall be complete with all necessary supporting frame works, Nuts and bolts etc. for securing the same to the floor. The operating mechanism shall operate (close/open) all the three phases simultaneously. The operating mechanism links etc. should be accessible for maintenance. Mechanical safety shutters should be provided between the breakers and panel. The circuit breakers and its operating mechanism shall be fully interlocked to prevent mal-operation. All the breakers shall be supplied with necessary clamps and connectors suitable for appropriate current ratings. Rigid type bimetallic/Al.alloy terminal connectors of 630 Amps. current rating form part of supply. Suitable arrangement of earthing the switchgears shall be provided. All the connecting bus bars shall be made of copper.

5.2.2.2 Switchgear (Vacuum Circuit breakers etc.)and control gear (CTs.,PTs, relays etc.)shall be mounted on the same Kiosk. Bus bars shall be air insulated with PVC insulation/sleeves on electrostatic powder coating. The bus bars should be of electrolytic copper with permissible limits of current density. Size of the bus bars and current density should be specified in the tender. The bus bars conductor shall conform to Indian standard 8084 and 3427 and shall be rated for 630 A,STC 16 KA for 3 sec.

5.2.2.3 All the meters, instruments, relays etc. shall be mounted on the switchgear kiosk. The outdoor circuit breakers Kiosk shall be suitable for AC series tripping arrangement.

5.2.2.4 The Kiosk shall have an arrangement for emergency shunt tripping from remote place in addition to arrangement for local emergency tripping(Mechanical). The kiosk shall also have a system to check the "Trip circuit healthy check" in all the three phases. Necessary trip and closing coils shall be provided for operation of the breakers.

5.2.2.5 All the six terminals shall be brought out through appropriate class bushings.

5.2.2.6 The arcing contacts shall be made of homogenious special alloy so that surge voltage are reduced to negligible level & multiple reignition is eliminated.

5.2.2.7 The circuit breaker kiosk shall be electrically and mechanically trip free under various conditions.

5.2.3 MAIN CONTACTS

The main contacts shall have adequate area and contact pressure for carrying rated continuous and short time current without excessive heating liable to cause pitting and welding.

The breakers may be provided with silver plated contacts, if necessary, to meet the requirement of IS:13118/IEC56 where higher temperature rise is permitted with silver plated contacts. The quantity of silver facing shall be such that after carrying out one tenth of total number of operations specified for mechanical endurance tests, there is still continuous layer of silver on contacts.

5.2.4 NUMBER & TYPE OF SPARE, AUXILIARY CONTACTS/ SWITCHES :

Adequate number of spare auxiliary switches/contacts both of normally open & normally close type but not less than four each shall be provided on the circuit breaker for use in the indication and controlling scheme of circuit breakers.

5.2.5 INTERLOCK

All electrical and mechanical interlocks which are necessary for safe and satisfactory operation of the circuit breaker shall be provided .

5.2.6 BUSHINGS FOR CIRCUIT BRAKER KIOSK

The out door circuit breakers shall be metal enclosed fitted with weather proof/ suitable type bushing conforming to IS:2099 and shall be designed to have the necessary mechanical strength and rigidity required and shall be free from objectionable interference and external and internal corona. The porcelain shall be of the wet process type, homogeneous, free from laminations and cavities or other flaws which could effect its chemical & mechanical strength and shall not be injuriously stressed by temperature change. The porcelain shall be thoroughly vitrified tough and impervious to moisture and shall be evenly glazed. The glazing shall be free from blisters or burrs. The bushing shall be designed manufactured & tested in accordance with latest edition of IS:2099. The type and characteristic data bushing shall be clearly specified.

5.2.7 OPERATING MECHANISM

Characteristics of Operating mechanism of circuit breaker and associated equipments :

Method of operation : The circuit breaker shall be equipped with power operated mechanism to operate all three phases simultaneously using 220/240 V AC Motor operated spring closing mechanism or magnetic actuator type. It shall be electrically & mechanically trip free under various conditions. Kiosk shall also be provided with hand operated spring charging closing mechanism. Operation counter and mechanically ON-OFF indicator shall be provided.

5.2.8 VACUUM CIRCUIT BREAKER

The three phase vacuum circuit breaker will have three vacuum interrupters (one interrupter per phase) mounted on same carriage. The interrupters shall be air insulated with epoxy resin / insulated phase barriers. Each interrupter shall have fixed and moving contacts in sealed envelops having vacuum below 10^{-6} torr. The metallic bellow shall permit axial movement of moving contact and act as vacuum seal. The contacts shall have requisite mechanical strength and good electrical and thermal conductivity and shall be made of copper chromium alloy. Complete literature of vacuum bottles shall be furnished with the tender.

5.2.9 VOLTAGE TRANSFORMERS

i)	**Highest equipment voltage**	**:**	**12 KV**
ii)	**No. of phases.**	**:**	**3 Nos. single phase VTs**
iii)	**Insulation level.**		
	a) Impulse withstand voltage	**:**	**75 KVP**
	b) One minute power frequency withstand voltage on :		
	i) Primary winding	**:**	**35 KV rms**
	ii) Secondary winding	**:**	**2 KV rms**
iv)	**Frequency.**	**:**	**50 Hz.**
v)	**Transformation ratio.**	**:**	**11000/110 V**
vi)	**Rated output.**	**:**	**100VA/Phase**
vii)	**Accuracy class.**	**:**	**0.5**
viii)	**Rated voltage factor.**	**:**	**1.2 continuous & 1.5 for 30 sec.**
ix)	**Type of insulation**	**:**	**Resin cast.**

VTs, shall be provided with HRC type fuses on the secondary side. The VT fuses on primary side shall also be provided with all safety precautions. One of the secondary terminals of the VTs, shall be solidly earthed. Three numbers single phase voltage transformer of this rated output will be required for each circuit

breaker kiosk. Voltage transformers shall be fixed type and shall be suitable for single phasing.

5.2.10 CURRENT TRANSFORMERS

i)	Rated voltage.	:	12 KV
ii)	Insulation level.		
	a) Impulse withstand voltage	:	75 KVP
	b) One minute power frequency withstand voltage on :		
	i) Primary winding	:	35 KV rms
	ii) Secondary winding	:	3 KV rms
iii)	Frequency.	:	50 Hz.
iv)	Rated continuous thermal current	:	120% of rated primary current
v)	Short time thermal rating and its duration.	:	16 KA for 3 sec.

vi) Transformation ratio of : CTs 400-200-100/5-5A	Core-I	Core.II
a) Rated output	15 VA	15 VA
b) Class of accuracy	5 P	0.5
c) Accuracy limit factor.	15	-
d) Purpose	Relaying	Metering
vii) Max.instrument security factor.	-	5

(VA burden should not be less than suitable for series tripping arrangement provided)

12 Kv current transformer shall be single phase. The core shall be of grade non ageing laminated silicon steel of low hysterisis loss and high permeability to ensure high accuracy at both normal and fault current.

5.2.11 The rating of secondary winding shall be 5 Amps. Required transformers ratio can be achieved in any manner, However, the current transformers will have to satisfy the requirement of rated VA burden, Class of accuracy , accuracy limit factor and short time thermal rating as have been specified above at all transformation ratio.

The rating of current transformers of all classes regarding ratio error, knee point voltage, resistance of secondary winding etc. shall have to be co-ordinated with the requirement of protective relays and protection scheme without any extra cost.

5.2.12 The tenderer shall also furnish along with the tender, complete general arrangement, schematic and outline diagrams indicating the mounting arrangement and position of current transformers, potential transformer, terminal block etc. Type of current transformers and potential transformers employed shall also be clearly stated.

5.2.13 INDICATING AND INTERGRATING METERS/INSTRUMENTS:

All indicating instruments shall be of switch board type, back connected suitable for flush mounting and provided with dust and vermin proof cases for tropical use and finished in suitable colour. All instruments shall have practical laboratory means of adjustment of accuracy. The limits of errors for ammeters/voltmeter shall be permissible for class 1.5 instruments as per IS:1248. The ammeters and voltments shall be suitable scaled to indicate the current for all the ratings of current/voltage transformers. A phase selector switch with four/six positions shall be used to measure the current/voltage of each phase. The meter shall be located at eye level to facilitate observation of readings correctly.

5.2.14 RELAYS :

The circuit breaker shall be fitted with AC Series tripping arrangement for operation on overload & earth fault by relays along with emergency shunt tripping from remote.

Three phase protection relays shall be Numerical Over-current & Earth Fault protection having 2 element for over current and one for earth fault protection. The setting for over-current shall be 50-200% (in step of 10%) and for earth fault element from 10 to 80% (in step of 10%). These relays shall be non directional with selectable curve from all standard 5 IDMT curves. The numerical relays shall have following features:-

a. Self Diagnosis
b. Minimum last five abnormal events recording (over current & earth fault) including fault level and phase.
c. On-line display of current.
d. Communicable with open Protocol having RS-485 port.

The relay shall be numerical type mounted in flush pattern on the panel board. The relay should be rated for 110V AC & 5 Amp. CT secondary. The relay should conform to IS:3231 & 8686 specifications. The tenders shall furnish the detail in this regard along with the offer.

All the relays shall be provided with test blocks in panel so designed that the relays may be tested in situ. The relays should have provision of testing either through test block or test plug easily accessible by injecting the voltage / current/frequency (as applicable) from external testing instruments /source without first disconnecting/ reenergizing the primary electrical circuit protected by the relays. Facilities for isolating the tripping circuit during such testing shall be also provided.

The requirement of test block shall not be applicable in case of drawout type relays which can be tested by using test plug without removing the relay from its casing.

The testing facilities provided in the relays shall be specifically stated in the bid. Necessary test plug etc. as may be required for proper testing shall be included in the contractor's scope of supply. One test plug with five panels or part thereof are to be supplied.

The technical suitability of relays/schemes may also be examined by Protection Wing & acceptability will be judged appropriately.

The bidder must furnish type test reports as per relevant ISS/ IEC along with bid to suit the environmental conditions of our State, in respect of the relay (of the type and design offered) which should have been type tested in NABL accredited test laboratory in respect of such tests for which the lab has been accredited (for Indian make Relays)/ CPRI/ Nationally accredited testing laboratory (for Foreign make Relays). These type test reports should not be older than three years from the date of opening of bid. Bids without Type Test reports will be treated as Non-Responsive.

The Following makes of Relays are acceptable:-

a. Areva.
b. ABB.
c. Easun Reyrolle
d. C&S
e. JVS
f. SEL
g. ASHIDA
h. MEGAWIN

Any other equivalent make of relays shall also be acceptable subject to approval by this office.

5.2.15 WIRING :

All wiring shall be of switch board type consisting of copper conductor of 2.5 sq.mm cross section insulated with polyvinyl chloride insulation suitable for 660V service and in accordance with relevant IS:732. Polyvnyl chloride used shall have excellent resistance against burning, moisture, oil and vermin and shall be finished with clear colour. Rubber insulated wiring shall not be acceptable. Tenderers shall furnish the details of method being adopted by them for joint/ connections.

All instruments and panel wiring shall be of heat resisting and self extinguishing type in compliance with British Standard Practice/IS. Plastic or porcelain cleats of the limited compression type shall be used for holding wiring runs. All wires shall be suitable for bending to meet the terminal studs at right angles. Metal cases of all apparatus mounted on kiosk shall be separately earthed by means of copper wire or strips. The following colour schemes of the wiring shall be used as per IS:375.

a) AC three phase circuits :

i) No.1 phase : Red
No.2 phase : Yellow
No.3 phase : Blue

ii) Neutral conductor : Black

iii) Connection to earth : Green

5.2.16 TERMINAL BLOCKS :

Terminal blocks shall be 650 V grade, box clamp type ELMEX 10 sq.mm or approved equal. Not more than two wires shall be connected to any terminal. Spare terminals equal in number to 20% of active terminals shall be furnished.

Terminal blocks shall be located to allow easy access. Wiring shall be so arranged that individual wires of an external cable can be connected to consecutive terminals.

5.2.17 TEST TERMINAL BLOCK :

Two Nos. test terminal block shall be provided one for testing of relays and other for testing meters. They shall be of switch board type back connected for front

of panel mounting. The test blocks shall provide complete isolation of meters, instruments etc. and the arrangement shall be such that testing power could be connected at the test block from any external source or may be taken from the instrument transformers. Provision shall be made for short circuiting current transformers. Suitable sealing arrangement shall be provided in test terminal blocks.

5.2.18 INDICATING LAMPS :

Indicating lamps shall be provided on the control board to indicate the following:

i) Visual indication of ON and OFF position of each circuit breaker.
ii) PT supply indication.

Each lamp body shall be of moulded insulation and shall be able to withstand a high voltage test of appropriate value. All lamps shall be suitable for 240 V AC supply and shall have low power consumption and shall provide a wide angle of illumination of sufficient intensity for comfortable viewing. A glass of appropriate colour shall be screwed into the front of lamp body. The design of indication lamp shall be such as to facilitate replacement of burnt lamps. An engraved lable indicating the purpose of the lamp shall be provided with each lamp.

5.2.19 FERRULES :

Ferrules engraved/printed with the same numbers, of symbols as indicated in the connections and wiring diagram shall be provided on the terminal ends of all wires for identification of circuits for inspection and maintenance. Ferrules shall be of strong and flexible insulating material with glossy finish to prevent adhesion. They shall be engraved/ printed and clearly marked and shall not be effected by dampness. Ferrule numbering shall be in accordance with IS:375. The same ferrules number shall not be used on wires in different circuits on a panel.

5.2.20 HT TVM:-

3 phase 4 wire A.C. Static H.T. Trivector meter of accuracy class 0.5 S for measurement of energy as per specification appended at Annexure-`A' shall be provided on each Outdoor VCB Kiosks.

Following makes of HT TVMs are acceptable to JVVNL :

i) Secure
ii) L&T
iii) ABB/Elster
iv) Schlumberger

5.3 SCHEDUOLE OF EQUIPMENTS, FITTING & ACCESSORIES :

12 KV 630 Amps Vacuum circuit breakers kiosks for out door installation :

5.3.1 1 No. - 12 kv 630 amp. vacuum circuit breaker horizontal draw out/ fixed type with provision of manual tripping by means of push button and emergency shunt tripping.

5.3.2 1 No. - AC Motor charged spring operated closing mechanism or magnetic actuator type closing mechanism.

5.3.3 1 No. - A.C. series tripping arrangement for operation on over current (load) and earth fault by relays along with emergency shunt tripping from remote place in addition to local emergency tripping(Mech.) One additional series trip coil, fitted very near to the original coil (which will be unwired) is also required to be provided.

5.3.4 3 Nos. - Single phase 12 KV current transformer ratio 400-200-100/5-5A suitable for metering and protection. The class of accuracy shall be 0.5 for metering and 5P15 for protection. Rated burden (output) shall be 15 VA for each secondary winding and it should not be less than suitable for tripping arrangement provided. Instrument security factor for metering core shall not be exceed 5.

5.3.5 6 Nos. - Rigid type bimetallic/ aluminium alloy terminal connector suitable for ACSR (10% Panther and 90% Dog Conductor) for both horizontal/ vertical take-off.

5.3.6 1 No. - Mechanical ON/OFF indicator.

5.3.7 1 No. - Operating handle for independent manual closing mechanism.

5.3.8 1 No. - Red indicating lamp for ON indication.

5.3.9 1 No. - Green indicating lamp for OFF indication.

5.3.10 Spare auxilliary contacts/switch having minimum 4 NO + 4 NC

5.3.11 1 No. - Flush mounting pattern 96x96 sq.mm Moving Iron ammeter of class 1.5 accuracy suitable scaled for 5 Amps. CT secondary.

5.3.12 1 No. - Ammeter selector switch to indicate phase current in all three phases and with OFF position.

5.3.13 1 No. – Numerical 2 O/C + E/F relay.

5.3.14 1 No. HT TVM of accuracy class 0.5S as per requirement mentioned at Annexure-A.

5.3.16 2 Nos. - 240 V AC single phase 80 or 100 watt anti condensation heaters with thermostat and switch.

5.3.17 1 No. - Automatic door illumination lamp with switch.

5.3.18 3 Nos. - 11000/110 V single phase voltage transformers each having 100 VA/phase burden & class of accuracy 0.5 suitably connected to meters and indicating instruments etc.

5.3.19 1 No. - Flush pattern switch board mounting pattern 96x96 sq. mm moving iron AC voltmeter of class 1.5 accuracy suitable for 110 V phase to phase secondary suitably scaled.

5.3.20 1 No. - Voltmeter selector switch to indicate phase to phase & phase to neutral voltage of all the three phases.

5.3.21 3 Nos. - Indicating lamps coloured Red,Amber Blue for PT supply.

5.3.22 2 Nos. - Test terminal blocks to test meters and relays with sealing arrangement.

5.3.23 1 No. - Blank lable on the front of kiosks at the top.

5.3.24 Door locks with keys for all doors.

5.3.25 Pair of base channel for grouting in floor.

5.3.26 Arrangement to check trip circuit healthy in all three phases.

5.3.27 1 set - Self auxiliary plug and socket.

5.3.28 1 No. - Ground bus system, size 25 x 8 mm copper.

5.3.29 1 No. - Alarm bell with timer for breaking tripping indication.

5.3.30 1 No. - Operation counter.

5.3.31 1 No. - Name plate at front and back of each kiosk.

5.3.32 1 set - 3 phase air insulated main copper bus bar of 630 amp. continuous current rating having maximum current density 1.5 Amp./ MM^2 with minimum cross sectional area 600 MM^2 with PVC insulation or sleeves, STC rating 16 KA for 3 sec.

5.4 MAKE AND TYPE OF BOUGHT OUT ITEMS :

The makes of all bought out items shall be acceptable if it is of "ISI Marked" or type tested for which tenderers shall furnish attested photostat copies of ISI Certificate/type test report not older than three years for the respective make offered along with tender.

5.4.2 Make / type of each relay, indicating instruments, integrating instruments, control switch for Circuit Breaker/Trip Transfer, selector switch for Voltmeter/Ammeter, Semaphore Indicator, indicating lamps, annunciator, Push Button, A.C. Hooter/Bell, D.C. Hooter, Heater, Link Type Test Terminal Block for testing of TVM, CFL Tube, 2/3 Pin Socket with Switch etc. shall be clearly and invariably indicated in the GTP (Guaranteed Technical Particulars), bill of material and unit price list. Only specific make accessories shall be indicated. The word "EQUIVALENT/REPUTED MAKE" will not be given for consideration.

Other standard accessories which are not specifically mentioned but are required to be supplied with circuit breaker kiosk of similar type and rating for efficient and trouble-free operation.

5.5 TEMPERATURE RISE :

The max. temperature rise of various parts of the circuit breakers when tested under rated condition shall not exceed the specified values at a peak ambient temperature of 50 deg.C . The breaker may be provided with silver plated contacts if necessary to meet the requirement of IS:13118/IEC:56 where higher temperature rise is permitted with silver plated contacts. The quantity of silver facing shall be such that after carrying out one tenth of the total number of operations specified for mech. Endurance test, there is a still

continuous layer of silver on the contacts. The temperature rise of CTs and PTs shall also not exceed the permissible values as per relevant Indian standards when corrected for max. ambient temperature at site.

6.0 TESTS :

6.1 TEST BEFORE DESPATCH : The 12 KV vacuum circuit breakers and accessories shall be subjected at maker's works before despatch, to the following tests as per relevant IS/IEC.

A) ROUTINE TESTS ON EACH UNIT AS PER RELEVANT STANDARDS :

(i) One minute power frequency voltage withstand dry test on main circuit.
(ii) Voltage withstand test on control & auxiliary circuits.
(iii) Measurement of the resistance of main circuit.
(iv) Mechanical operating test.
(v) Design and visual checks.

B) TYPE TESTS CONDUCTED ON ONE UNIT OF EACH RATING AS PER RELAVANT STANDARDS:

(i) Dielectric tests.
a) Lightning Impulse Voltage Test.
b) One Minute Power Frequency Test (Wet & Dry).
(ii) Short time withstand current and peak withstand current test.
(iii) Basic short circuit duties test.
(iv) Single phase short circuit test.
(v) Mechanical Operation test as per M-2 class.
(vi) Out of phase making & breaking test.
(vii) Capacitive Current Switching Test.
a) Cable Charging Test.
b) Single Capacitor Bank Current Switching Test.
(viii) Measurement of resistance of main circuit.
(ix) Temp. rise test.
(x) IP-55 Test (For cubicle/control cabinet).
(xi) Any other type tests not specified above but covered as per amendment/latest edition of relevant IS/IEC.

C) The type test reports of Circuit Breakers, Current Transformers, Potential Transformers, Relays, Meters etc. shall be complete in all respect as per relevant IEC/ISS.

6.2 TYPE TESTS :

The 12 KV vacuum circuit breaker kiosk offered shall be fully type tested as per relevant standards.

The bidder must furnish type test reports along with bid as per the qualification requirement of the Tender Specification.

However, the purchaser reserves the right to demand repetition of some or all the type tests in presence of purchaser's representative. For this purpose, the bidder should indicate unit rates for carrying out such type tests. These test charges shall not be taken into consideration for bid evaluation.

6.3 TEST ON BOUGHT OUT ITEMS :

Tests are not required to be performed on bought out equipments/items like motor, terminal connector, etc. at the works of manufacturer. Furnishing Test Certificate of these items from the original equipment manufacturers shall be deemed to be satisfactory evidence. Inspection of the tests at Sub-contractors works will be arranged by the supplier whenever required.

6.4 ROUTINE/ACCEPTANCE TESTS :

(i) The following acceptance and routine tests shall be got conducted in presence of purchaser's representative as per stipulation of the relevant standards, on each unit.

a) One minute power frequency voltage withstand dry test on main circuit.
b) Voltage withstand test on control & auxiliary circuits.
c) Measurement of the resistance of main circuit.
d) Mechanical operating test.
e) Design and visual checks

(ii) Inspection & tests on control gear.

In addition to the above tests at 6.4(i) above specified by IEC, the following shall also be performed at manufacturer's works in presence of purchaser's representative after completely assembling the kiosk.

a) Checking wiring of circuits and their contacts.
b) Insulation resistance of complete wiring, circuit by circuit with all equipment mounted on the panels.
c) Checking of operational protective schedule , instruments and meters.

d) Checking of phase faults between R&Y, Y&B and B&R phases. Kiosk should trip under all three conditions.

(iii) Temp. rise test on one No. Kiosk in the first offered lot shall also be done in the presence of the purchaser's representative.

(iv) Any other tests not specified above but covered as per amendment/latest edition of relevant IS/IEC.

6.5 TOLERANCE ON TEST RESULTS :

As per relevant standards/specification.

6.6 TEST AT SITE :

The purchaser reserves the right to conduct all tests on 12 KV circuit breakers after arrival at site and the contractor shall guarantee test certificate figures under actual service conditions.

7.0 INSPECTION :

All the tests (as mentioned at Clause 6.4) and Inspection shall be made at the place of manufacturer unless otherwise especially agreed upon by the bidder and purchaser at the time of purchase. The bidder shall afford the inspection officer(s) representing the purchaser all reasonable facilities without charges, to satisfy him that the material is being furnished in accordance with this specification. The purchaser has the right to have the tests carried out at his own cost by an independent agency whenever there is a dispute regarding the quality of supply.

The Inspection may be carried out by the purchaser at any stage of manufacture/ before despatch as per relevant standard.

Inspection and acceptance of any material under the specification by the purchaser, shall not relieve the bidder of his obligation of furnishing material in accordance with the specification and shall not prevent subsequent rejection if the material is found to be defective. The Bidder shall keep the purchaser informed in advance, about manufacturing programme so that arrangements can be made for inspection.

The purchaser reserves the right to insist for witnessing the acceptance/ routine testing of the bought out items.

The Bidder shall give 15 days advance intimation to enable the purchaser to depute his representative for witnessing the acceptance and routine tests. The

inspection charges(Inspectors traveling, boarding & lodging) would be to the purchaser's account.

8.0 QUALITY ASSURANCE PLAN

8.1 The tenderer shall invariably furnish following information along with his offer, failing which his offer shall be liable for rejection. Information shall be separately given for individual type of equipment offered.

(i) Statement giving list of important raw materials names of sub-suppliers for the raw materials, list of standards according to which the raw materials are tested. List of tests normally carried out on raw materials in presence of tenderer's representative, copies of test certificates.

(ii) Information and copies of test certificates as in (i) above in respect of bought out accessories.

(iii) List of manufacturing facilities available.

(iv) Level of automation achieved and list of areas where manual processing exists.

(v) List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspections.

(vi) Special features provided in the equipment to make it maintenance free.

(vii) List of testing equipments available with the tenderer for final testing of equipment specified and test plant limitation. If any, vis-a-vis the type, special acceptance and routine tests specified in the relevant standards. These limitations shall be very clearly brought out in schedule of deviations from specified test requirements.

8.2 The successful tenderer shall within 30 days of placement of order, submit following information to the purchaser.

(i) List of raw materials as well as bought out accessories and the names of sub-suppliers selected from those furnished along with offer.

(ii) Type test certificates of the raw material and ought out accessories.

(iii) Quality assurance plan (QAP) with hold points for purchaser's inspection. The quality assurance plan and purchasers hold points shall be discussed between the purchaser and supplier before the QAP is finalized.

8.3 The successful bidder shall submit the routine test certificates of bought out accessories and central excise passes for raw material viz oil, copper, aluminium, conductors, insulating materials, core material at the time of routine testing of the fully assembled equipment.

9.0 DOCUMENTATION

9.1 All drawings shall conform to International Standards Organization (ISO) `A', series of drawing sheet/Indian Standards specification IS:13118/IEC-56. All drawings shall be in ink and suitable for micro filming. All dimensions and data shall be in S. I Units.

9.2 List of drawings and documents

The bidder shall furnish four sets of following drawings along with his offer.

a) General outline and assembly drawings of the equipment i.e. breaker, CTs,PTs etc.

b) Graphs showing the performance of equipments in regard to magnetization characteristics.

c) Sectional views showing -
i) General Constructional features.
ii) the materials/ gaskets /sealings used.
iii) the insulation, the winding arrangements, method of connection of the primary/secondary winding to the primary /secondary terminals etc.
iv) porcelain used and its dimensions along with the mechanical and electrical characteristics.

d) arrangement of terminal's and details of connection studs provided.

e) Name Plate

f) Schematic drawing

g) Type test reports in case the equipment has already been type tested.

h) Test reports, literature, pamphlets of the bought out items, and raw material.

9.3 The successful tender shall, within 2 weeks of placement of order, submit three sets of final versons of all the above said drawings for purchaser's approval. The

purchaser shall communicate his comments/approval on the drawings to the supplier within four weeks. The supplier shall, if necessary, modify the drawings and resubmit three copies of the modified drawings for owners approval with in two weeks from the date of owner's comments. After receipt of owner's approval, the supplier shall within two weeks, submit 12 prints and two good quality reproducibles of the approved drawings for purchasers use.

9.4 Six sets of the type test reports, duly approved by the purchaser, shall be submitted by the supplier for distribution before commencement of supply. Adequate copies of acceptance and routine test certificate, duly approved by the purchaser shall accompany the despatch consignment.

9.5 The manufacturing of the equipments shall be strictly in accordance with the approved drawings and no deviation shall be permitted without the written approval of the purchaser. All manufacturing and fabrication work in connection with the equipment prior to the approval of the drawing shall be at the supplier's risk.

9.6 16 sets of nicely printed and bound volumes of operation, maintenance and erection manuals in English language, for each type and rating of equipment supplied shall be submitted by the supplier for distribution, prior to the despatch of the equipment. The manual shall contain all the drawings and information required for erection, operation and maintenance of the circuit breaker. The manual shall also contain a set of all the approved drawings, type test reports etc.

9.7 Approval of drawings/work by purchaser shall not relieve the supplier of his responsibility and liability for ensuring correctness and correct interpretation of the drawings for meeting the requirement of the latest revision of applicable standards, rules and codes of practices. The equipment shall conform in all respects to high standards of engineering, design, workmanship and latest revisions of relevant standards at the time of ordering and purchaser shall have the power to reject any work or materials which, in his judgement is not in full accordance therewith.

10. PACKING AND FORWARDING

10.1 The equipments shall be packed in crates suitable for vertical/horizontal transport as the case may be, and suitable to withstand handling during transport and outdoor storage during transit. The supplier shall be responsible for any damage to the equipment during transit, due to improper and inadequate packing. The easily damageable material shall be carefully packed and marked with the appropriate caution symbol. Wherever necessary, proper arrangement for lifting, such as lifting hooks etc. shall be

provided. Any material found short inside the packing cases shall be supplied by supplier without any extra cost.

10.2 Each consignment shall be accompanied with a detailed packing list containing the following information :

a) Name of the consignee.
b) Details of consignment
c) Destination
d) Total weight of consignment.
e) Sign showing upper/lower side of the crate.
f) Handling and unpacking instructions.
g) Bill of material indicating contents of each package.

10.3 The supplier shall ensure that the packing list and bill of material are approved by the purchaser before despatch.

11.0 Optional Spares

The bidder shall also recommend optional spares that will be required for breakers along with their total and unit prices. However, the prices of operation spares will not be considered for bid evaluation.

12.0 PERFORMANCE WARRANTY PERIOD :

The performance warranty period shall be 10 years from the date of receipt of equipment along with all accessories.

The supplier will be required to furnish a Performance Bank Guarantee @ 10% (for new suppliers)/ @ 5% (for old & established suppliers) amount of the total ordered value, which is required to be valid for 10 years.

Successful bidder shall attend the complaint within 15 days from the date of receipt of complaint and in case complaint is not rectified within 15 days period, penalty @ 0.5% (half percent) per week or part thereof shall be levied upon the supplier till complaint of breaker is attended and breaker is again kept in circuit.

13.0 Delay in Delivery of Inspected Material at Store :

If the material are not delivered within 7 days at same station, 14 days for station within State and 20 days by the suppliers situated outside the State from the date of receipt of the Dispatch Instructions. Charges shall be recovered @ Half Percent per week or part thereof (for actual delay in receipt), maximum

upto 3% of the Dispatch Instructions consignment value (Ex-works). This will be in addition to Clause No.1.24(1) of GCC.

14.0 PAYMENT:-

A) FOR NEW SUPPLIERS:

90% (Ninety percent) payment of each consignment shall be made along with taxes & duties by the Accounts Officer (CPC), Jaipur Discom, Jaipur subject to furnishing of SBG & PBG in terms of relevant clause of GCC and balance 10% payment shall be released on production of satisfactory installation & commissioning report of 12 KV Outdoor Vacuum Circuit Breaker Kiosks duly verified by the Nodal Officer. In absence of furnishing of Security Bank Guarantee & Performance Bank Guarantee, 78% payment of the cost of each consignment along with 100% taxes, duties and freight and insurance charges shall be made on production of receipted challan duly verified by the consignee & 10% payment shall be released on production of satisfactory installation & commissioning report of 12 KV Outdoor Vacuum Circuit Breaker Kiosks duly verified by the Nodal Officer. No payment shall be released without furnishing of complete type test reports.

B) For old & established suppliers:-

75% (Seventy Five Percent) Payment of each consignment with taxes & duties shall be payable on supply of breakers in absence of type tests, 10% (Ten Percent) Payment shall be payable on production of satisfactory Installation & Commissioning Report of the breaker by the respective field officer and balance 15% payment will be released after successful type test reports. In case of failure of any of the type test reports, the balance 15% payment shall be forfeited for the used material and remaining unused material will be lifted back by the supplier"

15.0 QUANTITY :

12 KV OUTDOOR VCB KIOSKS : 3900 Nos.

The quantity as indicated above is approximate and may be increased or decreased to any extent at the time of finalization of this tender enquiry.